202 is a cover
204 is a scanner or photocopier
206 is a scanner or photocopier platen
208*a–c* are defects in the scanner glass
110*a–e* are digital images of the five sheets of paper
120*a–e* are maps of deviant regions
125 is a deviant region
130*a–e* are maps of defective regions
135 is a defective region

FIG. **2**

10 is the start of the simple embodiment
20 is the step of initializing the parameter
30 is the step of acquiring a serially numbered image
40 is the step of creating a map of deviant regions
50 is the step of adding deviant region to a map of potential defects
60 is the step of scoring each region
70 is the step of removing obsolete regions
80 is the step of detecting high-scoring regions

FIG. **3**

400 is a digital image of a typical page containing printed text
410 is a gridding of a digital image
440 is a grid cell in which some text falls
450 is a grid cell in which no text falls
420 is a grid cell map that show the total deviation of each grid cell to the closest percentage
460 is the total deviation of grid cell **440**
470 is the total deviation of grid cell **450**
430 is a map of active and inactive segments
480 is an inactive segment
490 is an active segment

FIG. **4**

140*a–e* are five sheets of paper, containing some dirt.
200 is a scanner or photocopier lid
202 is a cover
204 is a scanner or photocopier
206 is a scanner or photocopier platen
208*a–c* are defects in the scanner glass
150*a–e* are digital images of the five sheets of paper
160*a–e* are maps of deviant regions
126 is a deviant region
127 is a deviant region
170*a–e* are maps of defective regions
136 is a defective region
137 is a defective region

FIG. **5**

300*a*–**300***c* are digital images captured by a video camera
302*a–c* are images of a CCD defect differing from the surrounding area
304*a–c* are images of a CCD defect differing from the surrounding area
310*a–c* are representations of active segments and deviant regions
312*a–b* are deviant regions
320*a–c* are maps of defective regions
360 is a defective region

FIG. **6**

610 is the start of process of deviant region map construction
620 is the step of applying a median filter
630 is the step of subtracting the filtered image from the image
640 is the step of creating deviant regions
650 is the optional step of combining deviant regions
660 is the step of reporting the set of regions

FIG. **7**

700 is the start of the preferred embodiment
705 is the initialization
710 is the step of deciding options
715 is the step of acquiring an image
720 is the optional step of qualifying the image
725 is the step of assigning a serial number to the image
730 is the optional step of dividing the image into sample-areas
735 is the optional step of excluding text
740 is the step of constructing deviant regions
745 is the optional step of excluding highly deviant regions
750 is the step of adjusting the score target value
755 is the step of processing the deviant regions into defects
760 is the step of reporting the defects found.

FIG. **8**

800 is the start of the defect scoring process
810 is the step of adding deviant regions to the map of potential defects
820 is the step of applying the scoring function to each region
830 is the step of finding the high-scoring regions
840 is the step of removing obsolete regions
850 is the optional step of combining intersecting defective regions
860 is the step of reporting the high-scoring regions

5 SUMMARY

The defect detection method dynamically identifies positional defects corrupting a two-dimensional data acquisition device such as a scanner or video camera. Each time an image is acquired, it is optionally qualified to determine if it differs substantially from the last processed image. If so, it is optionally processed to exclude the non-sample area of the image. The remaining portion is then optionally processed to designate as inactive segments of high total deviation. A map of small deviant regions of high variability is constructed. These deviant regions are added to a map of potential defects. Each potential defect in this map is scored to determine if it represents a defect of the instrument. Scoring functions measure the positional correspondence of a deviant region in several images. A preferred embodiment of the scoring is to count the number of images having a deviant region overlapping the region being scored. Potential defects that have become obsolete are removed from the map of potential defects. The high-scoring regions may then be conglomerated into a map of non-intersecting defective regions. This map may be used to automatically compensate for the defects or to alert an operator to their existence and position.

6 BRIEF DESCRIPTION OF THE DRAWINGS

FIG. **1** shows the objects and products of the defect detection method.

FIG. **2** is a block diagram of a simple embodiment of the defect detection method.

FIG. **3** depicts the object and products of a process for separating generally homogeneous areas from areas containing text or other highly variant image data.